TOOELE CHEMICAL AGENT DISPOSAL FACILITY (TOCDF)

DEMONSTRATION TEST PLAN FOR THE AUTOCLAVE SYSTEM

APPENDIX B

AUTOCLAVE SYSTEM SHAKEDOWN PLAN

Revision 0

October 21, 2008

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AUTOCLAVE SHAKEDOWN PLAN

1.0 INTRODUCTION

The Tooele Chemical Agent Disposal Facility (TOCDF) was designed and built on the Deseret Chemical Depot (DCD) as a hazardous waste disposal facility for the United States (U.S.) Army. The TOCDF is designed to dispose of the chemical agents GB, VX, and mustard (H-series), drained munitions, contaminated refuse, bulk containers, liquid wastes, explosives, and propellant components, which are all a part of the chemical agent stockpile at DCD. The DCD is located 20 miles south of Tooele, Utah. EG&G Defense Materials, Inc., (EG&G) operates the TOCDF under contract to the U.S. Army through the Chemical Materials Agency (CMA).

The TOCDF has purchased a 6-foot diameter x 20-foot-long direct steam autoclave, which was designed for medical waste sterilization. However, this autoclave technology has also been tested to decontaminate agent-contaminated waste. The TOCDF is required to perform testing to demonstrate compliance with its Resource Conservation and Recovery Act (RCRA) Permit for handling secondary waste. This testing will be the Autoclave Demonstration Test (ADT) and will include a demonstration that the system can meet the decontamination goals of the project. A pre-demonstration shakedown period is necessary for TOCDF to ensure that the appropriate processes are in place, the workers understand how to perform the tasks involved in the secondary waste decontamination process, and the equipment is functioning properly.

The Autoclave System Shakedown process will commence when approval for the demonstration test plan is received from the State of Utah Department of Environmental Quality (DEQ), Division of Solid and Hazardous Waste (DSHW). During shakedown, the autoclave will be thoroughly tested to verify that it performs in a safe, consistent, and predictable manner when processing agent-contaminated secondary waste.

The Autoclave System includes a 6-foot diameter x 20-foot-long Bondtech autoclave with a steam vacuum eductor, high volume steam condensers, and a conveyor. The exhaust vent from the autoclave is routed to the building ventilation system, followed by a carbon filter system. Condensate is collected in a 175-gallon holding tank, and then pumped to one of two 1,000-gallon Spent Decontamination System (SDS) tanks for decontamination prior to being shipped off-site for disposal.

The secondary waste operation conditions for the TOCDF autoclave will be developed during the shakedown period.

For the autoclave, the objectives of the shakedown are to:

- Demonstrate the ability of the autoclave to treat a variety of secondary wastes to agent concentrations that allow the safe handling of the wastes until they can be shipped to a Treatment, Storage, and Disposal Facility (TSDF) based on feeding Demilitarization Protective Ensemble (DPE) suits, Life Support System (LSS) hoses, and wood.

- Familiarize the operators and support personnel with the Autoclave System for decontaminating secondary waste.

- Establish operating conditions governing the treatment of secondary wastes in the autoclave that establish an operating envelope allowing the treatment of the secondary wastes based on waste temperatures and treatment times.

- Characterize the condensate samples to establish the final treatment for the condensate waste stream.

- Establish the process to monitor agent inside the autoclave to ensure satisfactory treatment of secondary waste.

2.0 PREPARATORY ACTIVITIES

Several administrative activities to prepare for agent-contaminated waste processing will take place simultaneous to plant activities. The status of all operator, maintenance, and shift risk management personnel training and certification will be audited, including signoff sheets for procedure (and other pertinent) changes specific to the agent-contaminated secondary waste handling process. Any remaining entries in logs such as the Temporary Change Log, the Lock Out/Tag Out Log, and the log of open Maintenance Work Orders will be evaluated for any impact on the agent secondary waste handling process. Finally, the plan for Environmental and Quality Assurance audits and surveillances will be reviewed to ensure proper coverage.

Formal briefings of key shift personnel will begin two days prior to the start of Autoclave System Shakedown processing, as required by the TOCDF Operations Project Regulatory Procedure (PRP-OP)-044, *Critical Activities Manual*. Preparations for a new agent decontamination process are governed by Critical Activity # CA-01, which provides for the briefing of key management and shift personnel for two days before the agent secondary waste handling process begins. The briefings are repeated on each of the first three days of the new campaign. These briefings ensure that the processing team is prepared prior to commencing the campaign; they also help personnel evaluate the adequacy of the preparations once the secondary waste handling process has begun.

Environmental personnel will conduct a review of permit requirements and issues. In addition, they will confirm that all modifications have been incorporated into the appropriate permits and will review laboratory and monitoring procedures to ensure that the provisions of the Waste Analysis Plan (WAP) have been satisfied. Certain types of plant modifications require that an independent Professional Engineer certify the proper completion of construction through a Facility Construction Certification (FCC); therefore, the completion of any FCC activities will be confirmed.

Environmental will verify receipt of State approval of the demonstration test plan and that all permit conditions for agent-contaminated secondary waste handling and autoclave processing have been met. In addition, they will notify the Autoclave Manager when the plant has met the environmental requirements for startup, and then inform the DSHW of the same before processing agent-contaminated secondary waste in the Autoclave System.

3.0 GENERAL SHAKEDOWN ACTIVITIES

The DSHW will be provided with two weeks notice before contaminated secondary waste is introduced into the Autoclave System. Non-agent-contaminated secondary waste material (i.e., DPE material, wood, LSS air hoses) will initially be used to establish the function of the Autoclave System and test for any potential Automatic Continuous Air Monitoring System (ACAMS) interferents. Once the ACAMS monitoring system is verified, VX-contaminated waste will be introduced into the Autoclave System to bring the unit to a point of operational readiness by establishing the optimal time and temperature, and maximum load capacity. This phase will take four-to-six weeks and consist of up to 720 hours of agent-contaminated secondary waste processing. If events dictate that more time is needed to ensure operational readiness before the demonstration test, TOCDF will request an extension of up to 720 additional hours of operating time. Extreme caution will be exercised as shakedown operations begin to ensure that all systems are functioning properly for the new Autoclave System.

The TOCDF will conduct the shakedown as pre-testing at the proposed demonstration test conditions during the 720-hour shakedown to verify autoclave performance. Pre-testing will be conducted using the ACAMS to verify that no agent levels are greater than or equal to (≥) 1.0 VSL exist in the autoclave following the completion of the autoclave cycle. The TOCDF may request final modifications to the demonstration test plan based on the pretest results; any such changes will be coordinated with DSHW.

The collection and analysis of samples during shakedown will follow the provisions in the WAP.

A dry run for the autoclave will be performed once it demonstrates the ability to process agent-contaminated secondary waste at design parameters. The test will be run using the autoclave and the ACAMS to monitor for agent as proposed in the demonstration test plan. The dry run will consist of one run at proposed test conditions for each type of waste to be demonstrated. The objectives of this dry run are to:

- Operate the autoclave at full demonstration test conditions for an established period of time at maximum temperatures.
- Demonstrate performance capabilities of the complete system and its individual components.
- Finalize preliminary operating conditions for the demonstration test.
- Confirm that the process data collection can meet the needs for the ADT. This includes verification that the ACAMS will produce the data needed for a successful test.

The dry run results will be evaluated, and the test conditions for the demonstration test results will be finalized.

4.0 AUTOCLAVE SYSTEM SHAKEDOWN ACTIVITIES

The following outlines the steps that will be taken during shakedown. The activities begin after the specified number of processing bins of secondary waste are established. Transitions between steps will be at the discretion of the EG&G Autoclave Manager and Test Director.

4.1 Initial Ramping of Feed

To begin, the processing bins (with a determined amount of agent-contaminated secondary waste and four thermocouples positioned at different locations within the load) will be placed inside the autoclave. Only one bin will be processed in the initial stage. Additional waste will be added until all available bins are used. This process will be repeated until testing has been completed with a combination of all four types of waste along with the drums used to store the secondary waste.

4.2 Sustained Autoclave System Feed Operations

After establishing maximum load size, optimal temperature, and appropriate time intervals, the autoclave operating parameters will undergo a final optimization. During this portion of the shakedown, Operators will verify that:

- The system is within operating parameters.
- The autoclave containing secondary waste will be monitored for any signs of agent contamination at the end of the cycle. If ACAMS indicates that agent is present with any load, that load will be processed with additional time as necessary.
- The autoclave condensate drain lines will be analyzed during the demonstration test for metals and agent levels to ensure that all levels are below the Waste Control Limit.

Following final optimization, a performance run will be conducted to confirm that the autoclave is ready for the demonstration test. These performance runs will consist of processing the four types of secondary waste using the same conditions under which the demonstration test will be conducted.

5.0 POST-DEMONSTRATION-TEST ACTIVITIES

Treatment of secondary wastes in the autoclave will continue after completion of the ADT and the wastes will be held on-site until the preliminary data from the testing can be submitted to DSHW and approved. The preliminary data submitted will include the operational data from the autoclave, ACAMS data from the autoclave headspace, the analyses results from the spiked samples, and the agent results from the condensate samples. Upon approval of the preliminary data submittal, the wastes treated during the ADT and the post-test wastes treated will be sent to a Subtitle C TSDF. Monitoring the headspace in the autoclave at the end of the treatment cycle will continue during this time period to ensure that the wastes have met their treatment conditions.